

## SECTION X

**Waste Compatibility****X.A Well Tests Conducted**

TexCom Gulf Disposal's proposed injection well, WDW-315, was previously drilled in 1999 by the former owners of the facility and never put into service. Various tests have been performed on the formation fluids and core retrieved during well drilling. The following discussion summarizes the findings and use of those tests.

**X.A.1 Formation Fluid Analysis**

ACE Technologies performed detailed analysis of the formation fluid sample retrieved during the drilling of the WDW-315 well. Tests included Total Chlorides, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), pH, Metals, Minerals, and other basic parameters. The results reveal the chloride concentration in the formation and provide a template for future injectate comparisons and tests. See Appendix 5, "Well Drilling and Completion Report WDW-315", Section 4.0, Table 4-1, Formation Fluids Laboratory Analysis, ACE Technologies

**X.A.2 pH – Permeability Analysis and Evaluation**

OMNI laboratories performed routine, petrographic, and formation compatibility analysis using the solid core retrieved during the drilling of the WDW-315 well. **Core slabs** were examined, selected, cleaned, and separated into five (5) sand and one (1) shale plug. Permeability to air, porosity, and grain density were measured or calculated for the sand plugs. Average results were:

Permeability to Air	417 md
Porosity	27%
Grain Density	2.66 g/cc

Petrographic analysis of sand cores was performed including detailed thin section analysis, scanning electron microscopy (SEM), and X-ray diffraction. Quartz is the dominant framework grain type and porosity development is moderate to good. The dominant cement is analcime and the total clay content is 9-25% by weight and is comprised of kaolinite, illite/smectate, and chlorite. The analcime may infill pores/pore throats and, instead of HCL or HF, a weak HCL (5%) of acetic acid should be used for completion fluids. Kaolinite may pose a fines migration issue at high flow rates. Carbonates were found at <=5%.

Sand and shale samples were saturated with 4% KCL, pressured to 2000 psi net continuing stress, injected with KCL brine, and observed for permeability. Shale and sand permeabilities were, respectively 0.010 and 820 md. Permeability to brine versus throughput data were calculated for pH from 3 to 10 and %KCL from 0.5 to 4. Very little damage was observed with injection fluids. The 3 pH injection reduced permeability approximately 4% and the 10 pH injection reduced the permeability a further 3%. See Appendix 5, "Well Drilling and Completion Report WDW-315", Exhibit 7 Core Study pH-Permeability Analysis & Evaluation, OMNI Laboratories

#### **X.A.3 Pore Throat Analysis**

TexCom Gulf Disposal requested OMNI laboratories conduct pore throat analysis on the WDW-315 well core, using mercury injection capillary pressure methods. Results showed a median pore diameter equaled to approximately 15 micron. This test is used to guide TGD in setting particle and oil injection sizes. See Appendix 5, "Well Drilling and Completion Report WDW-315", Exhibit 7, Mercury Injection Capillary Pressure.

#### **X.A.4 Critical Salinity Analysis**

TexCom Gulf Disposal requested OMNI laboratories conduct critical salinity analysis on the WDW-315 well core, using various brine concentrations and permeability versus throughput methods. Various fluids were injected, at 2000-psi net confining stress, into the core and pore volumes were measured. Injectate included formation brine and brine at chloride concentrations of 30,000 ppm, 15,000 ppm, 7500 ppm, 3250 ppm, and 1125 ppm. De-ionized water was also tested. The first observable decline in ph-permeability occurred with 15,000 ppm injectate. Based on these results, TGD will ensure that all composite waste streams meet a minimum chloride concentration of 15,000 ppm chlorides prior to injection. See Appendix 5, "Well Drilling and Completion Report WDW-315", Exhibit 7, Permeability versus Throughput, Miscibly Extracted-State Sample.

### **X.B Un-constructed Well Testing**

Proposed Wells #2, #3,, & #4 have not been drilled. As discussed in Section VI – Well Construction, additional formation testing and coring will be conducted if necessary for the operation of the facility. TGD does not intend to conduct any additional well coring or formation fluid testing at this time.